PLANT AND SOIL

International Journal of Plant Nutrition, Plant Chemistry, Soil Microbiology and Soil-borne Plant Diseases.

Revue internationale de nutrition des plantes, de chimie végétale, de microbiologie du sol et des maladies des plantes en rapport avec le sol.

Internationale Zeitschrift für Pflanzenernährung, Pflanzenchemie, Bodenmikrobiologie und bodenbedingte Pflanzenkrankheiten.

Issued under the auspices of the

"Koninklijk Genootschap voor Landbouwwetenschap"

(Royal Netherlands Society of Agricultural Science)

Managing Editor: G. H. Arnold, Institute for Soil Fertility. Haren (Gr.). Netherlands.

Assistant Editors:: J. K. Smit, Epe, and A. Houwers, Wageningen.

Druk: Koninklijke Drukkerij Van de Garde B.V., Zaltbommel

Plant and Soil

INTERNATIONAL JOURNAL OF PLANT NUTRITION,
PLANT CHEMISTRY, SOIL MICROBIOLOGY AND
SOIL-BORNE PLANT DISEASES

VOLUME 47

THE HAGUE
MARTINUS NIJHOFF
1977

© 1977 by Martinus Nijhoff, The Hague, Netherlands
All rights reserved, including the right to translate or to reproduce this journal or parts thereof in any form

PRINTED IN THE NETHERLANDS

CONTENTS — TABLE DES MATIERES — INHALT

PAGE

B. V. ALIMAGNO and T. YOSHIDA, *Short Communication. In situ* acetylene-ethylene assay of biological nitrogen fixation in lowland rice soils 239

M. S. AULAKH and N. S. PASRICHA, Interaction effect of sulphur and phosphorus on growth and nutrients content of moong (*Phaseolus aureus* L.) 341

R. BÆRUG and J. H. MARTINSEN, The influence of sewage sludge on the content of heavy metals in potatoes and on tuber yield 407

R. R. BROOKS, E. D. WITHER and B. ZEPERNICK, *Short communication.* Cobalt and nickel in *Rinorea* species 707

R. BUR, P. MORARD et J. BERDUCOU, Importance des racines séminales et adventives pour la croissance et la nutrition cationique du sorgo-grain (*Sorghum dochna*) 1

R. S. CHAHAL and S. P. S. AHLUWALIA, Neutroperiodism in different varieties of groundnut with respect to zinc and its uptake as affected by phosphorus application 541

WILLIAM R. CHANEY, RICHARD G. STRICKLAND and ROBERT J. LAMOREAUX, *Short communication.* Phytotoxicity of cadmium inhibited by lime 275

F. M. CHAUDHRY, F. HUSSAIN and A. RASHID, *Short communication.* Micronutrient availability to cereals from calcareous soils 297

R. B. CLARK, Effect of aluminum on growth and mineral elements of Al-tolerant and Al-intolerant corn 653

P. S. CORNISH and R. J. RAISON, *Short communication.* Effects of phosphorus and plants on nitrogen mineralisation in three grassland soils 289

I. P. Cumbus and L. W. Robinson, The function of root systems in mineral nutrition of watercress (*Rorippa nasturtium-aquaticum* (L.) Hayek) 395

E. Dayan, A. Banin and Y. Henis, Studies on the mucilaginous layer of barley (*Hordeum vulgare*) roots 171

A. Ebregt and J. M. A. M. Boldewijn, Influence of heavy metals in spruce forest soil on amylase activity, CO_2 evolution from starch and soil respiration 137

A. W. S. M. van Egeraat, Enzymatic studies on ninhydrin-positive compounds exuded by root tips of pea seedlings . . 645

A. W. S. M. van Egeraat, *Short communication.* Growth requirements of *Rhizobium leguminosarum*, strain PRE . . 699

James R. Ellis, Fred A. Norstadt and T. M. McCalla, Patulin effects of wheat plants in field treatments 679

E. D. Ford and J. D. Deans, Growth of a sitka spruce plantation: spatial distribution and seasonal fluctuations of lengths, weights and carbo-hydrate concentrations of fine roots 463

Maurice Fried and Victor Middleboe, *Short communication.* Measurement of amount of nitrogen fixed by a legume crop . 713

C. Gonzalez Garcia and Sanchez de la Puente, The absorption of manganese (III) in oat plants 229

Shigeyoshi Gotoh and Hiroshi Koga, Mercury in rice soils veloped on saga polder lands, Northern Kyushu, Japan . . 49

Joseph Guggenheim and Y. Waisel, Effects of salinity, temperature, and nitrogen fertilization on growth and composition of rhodes grass (*Gloris gayana* Kunth.) 431

Umesh C. Gupta, *Short communication.* Effects of boron and limestone on cereal yields and on B and N concentration of plant tissue 283

J. Halevy, Estimation of available potassium for cotton by soil analysis 363

Joseph G. Hancock, Soluble metabolites in intercellular re-

gions of squash hypocotyl tissues: implications for exudation 103

M. M. HARRIS and M. F. JURGENSEN, Development of Salix and Populus mycorrhizae in metallic mine tailings 509

D. P. HEENAN and O. G. CARTER, Influence of temperature on the expression of manganese toxicity by two soybean varieties 219

C. D. JOHN, *Short communication.* The structure of rice grown in aerobic and anaerobic environments 269

A. S. R. JUO and R. LAL, The effect of fallow and continuous cultivation on the chemical and physical properties of an alfisol in western Nigeria 567

A. S. R. JUO and F. O. UZU, Liming and nutrient interactions in two ultisols from southern Nigeria 419

S. S. KADAM, K. G. KACHHAVE, J. K. CHAVAN and D. K. SALUNKHE, *Short communication.* Effect of nitrogen, Rhizobium inoculation and simazine on yield and quality of Bengal gram (*Cicer arietinum* L.) 279

H. KAGAWA, The significance of organic N compounds as the substrate for the iron-reduction metabolisme in the submerged paddy soils 81

B. T. KANG and F. R. MOORMANN, Effect of some biological factors on soil variability in the tropics. I. Effect of pre-clearing vegetation 441

B. T. KANG, Effect of some biological factors on soil variability in the tropics. II. Effect of oil palm tree (*Elaeis guinensis* (Jacq.) 451

K. K. KAPOOR, D. P. SINGH, K. C. KHANDELWAL and M. M. MISHRA, *Short communication.* Effect of aldrin on nodulation, nitrogen fixation and yield of bengal gram (*Cicer arietinum*) 249

K. C. KHANDELWAL, *Short communication.* Effect of a formulation of urea, thiourea and humate of nitrogen availability and yield of wheat 717

B. L. Koch, *Short communication.* Associative nitrogenase activity by some Hawaiian grass roots 705

D. Lamb, Relationships between growth and foliar nutrient concentrations in *Eucalyptus deglupta*. 495

Kuk-Ki Lee, Bonifacio Alimagno and Tomio Yoshida, Field technique using the acetylen reduction method to assay nitrogenase activity and its association with the rice rhizosphere 519

P. H. Le Mare, Experiments on effects of phosphorus on the manganese nutrition of plants. I. Effects of monocalcium phosphate and its hydrolysis derivates on manganese in ryegrass grown in two Buganda soils 593

P. H. Le Mare, Experiments on effects of phosphorus on the manganese nutrition of plants. II. Interactions of phosphorus, calcium and manganese in cotton grown with nutrient solutions 607

P. H. Le Mare, Experiments on effects of phosphorus on the manganese nutrition of plants. III. The effect of calcium: phosphorus ratio on manganese in cotton grown in Buganda soil 621

J. M. Lynch and N. White, Effects of some -non-pathogenic micro-organisms on the growth of gnotobiotic barley plants 161

Mary MacFarlane and D. Walmsley, Effect of soil solution phosphorus in volcanic ash soils on the response of tomato (*Lycopersicum esculentum*) to added phosphate. 547

A. Mahmoud and J. P. Grime, A comparison of the susceptibility of *Arrhenatherum elatius* (L.) Beauv. ex. J. C. Presl, *Agrostis tenuis* sibth, *Deschampsia flexuosa* and *Festuca ovina* to manganese toxicity 559

D. C. Malcolm and M. F. Garforth, The sulphur:nitrogen ratio of conifer foliage in relation to atmospheric pollution with sulphur dioxide 89

T. W. Massee, R. A. Olsen and E. O. Skogley, Characterizing soil fertility by ion diffusive flux measurements. . . . 663

P. K. Nayar, A. K. Misra and S. Patnaik, Evaluation of silica-supplying power of soils for growing rice 487

M. B. Page and O. Talibudeen, Nitrate concentrations under winter wheat and in fallow soil during summer at Rothamsted 527

B. Palmer and R. S. Jessop, Some aspects of wheat cultivar response to applied phosphate 63

Conway L. Powell, Effect of phosphate fertilizer and plant density on phosphate inflow to ryegrass roots in soil. . . . 383

K. P. Prabhakaran Nair and Gaurav Prabhat, Differential response of tropical maize genotypes to zinc and manganese nutrition 149

Mahendra Prasad and Satish Kumar Sinha, *Short communication.* Survival and retention of infectivity of bacterial stalk rot pathogen of maize and its perpetuation on varied cropping pattern. 245

D. Niranjan Rao and D. S. Mikkelsen, Effect of rice straw additions on productions of organic acids in a flooded soil. . 303

D. Niranjan Rao and D. S. Mikkelsen, Effects of CO_2, CH_4 and N_2 on growth and nutrition of rice seedlings 313

D. Niranjan Rao and D. S. Mikkelsen, Effects of acetic, propionic, and butyric acids on rice seedling growth and nutrition 323

Stephen Rodell, B. R. Funke and J. T. Schulz, Effects of insecticides on acetylene reduction by *Azotobacter vinelandii* and soybean nodules 375

J. D. Russell and H. A. Anderson, *Short communication.* Comment on 'Contamination of humic acid by silica gel and sodium bicorbonate' by K. H. Tan 263

R. Ryan, S. Miyamoto and J. L. Stroehlein, *Short communication.* Relation of solute and sorbed boron to the boron hazard in irrigation water 253

M. S. M. Saber, M. Yousry and M. O. Kabesh, Effect of man-

ganese application on the activity of phosphate-dissolving bacteria in a calcareous soil cultivated with pea plants . . . 335

K. L. SAHRAWAT and S. K. MUKERJEE, Nitrification inhibitors. I. Studies with karanjin, a furanolflavonoid from karanja (*Pongamia glabra*) seeds 27

K. L. SAHRAWAT, S. K. MUKERJEE and K. C. GULATI, Nitrification inhibitors. II. Studies with furano compounds . . . 687

S. R. SAIF and A. G. KHAN, The effect of vesicular-arbuscular mycorrhizal associations on growth of cereals. III. Effects on barley growth 17

J. S. SARDESHPANDE, R. H. BALASUBRAMANYA, J. H. KULKARNI and D. J. BAGYARAJ, Protozoa in relation to Rhizobium S-12 and *Azotobacter chroococcum* in soil 75

S. C. SHEPPARD and M. H. MILLER, Temperature changes and the geotropic reaction of the radicle of *Zea mays* L. 631

H. SHIGA, W. B. VENTURA and T. YOSHIDA, Effect of deep placement of ball-type fertilizer at different growth stages on yield and yield components of the rice plant in the Philippines 351

BIJAY SINGH and G. S. SEKHON, Some measures of reducing leaching loss of nitrates beyond potential rooting zone. III. Proper crop rotation 585

ROOM SINGH and B. P. GHILDYAL, Influence of soil edaphic factors and their critical limits on seedling emergence of corn (*Zea mays* L.) 125

V. K. TIWARI and BHARAT RAI, *Short communication*. Effect of soil burning on microfungi 693

G. TROLLDENIER, Mineral nutrition and reduction processes in the rhizosphere of rice 193

G. TROLLDENIER, Influence of some environmental factors on nitrogen fixation in the rhizosphere of rice 203

B. VENKATESWARLU, V. V. S. S. PRASAD and A. V. RAO, Ef-

fects of low light intensity on different growth phases in rice (*Oryza sativa* L.) 37

J. P. WACQUANT, *Short communication.* Physiochemical selectivity for cations and CEC of grass roots 257

S. P. WANI and P. A. SHINDE, Studies on biological decomposition of wheat straw. I. Screening of wheat-straw decomposing micro-organisms *in vitro* 13

M. YAMAGUCHI and Y. KOMATSU, *Short communication.* Direct determination of dissolved oxygen in soil water by gas chromatography 265

TOMIO YOSHIDA and BENJAMIN C. PADRE, JR., Transformation of soil and fertilizer nitrogen in paddy soil and their availability to rice plants 113